Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) A method for generating a service level agreement delay value for a network, comprising:

    receiving a set of network delay samples;

    generating a path delay for a path through the network over a specified time period using the set of network delay samples;

    generating a confidence interval for the path delay using the specified time period, the set of network delay samples, and a confidence level; and

    generating the service level agreement delay value using the path delay and the confidence interval.

2. (Original) The method of claim 1, further comprising applying a data sieve to the set of network delay samples.

3. (Original) The method of claim 1 wherein the specified time period is a path busy period for the path.

4. (Original) The method of claim 3, wherein determining a path busy period further includes:

    receiving a time period;

    generating a first path delay over the time period at

a first time point using the set of network delay samples;

generating a second path delay over the time period at a second time point using the set of network delay samples; and

generating the path busy period by comparing the first path delay to the second path delay.

5.   (Original) The method of claim 4, wherein generating a path delay at a time point further includes:

determining a set of trunks included in the path;

for each trunk in the set of trunks, performing the following:

generating a trunk delay for a trunk over the time period at the time point using the set of network delay samples; and

adding the trunk delay to the path delay.

6.   (Original) The method of claim 1, wherein generating a confidence interval for the path delay further includes:

determining a set of trunks included in the path;

generating a set of trunk delay standard deviations from the set of trunks for the specified time period using the set of network delay samples;

generating a path delay standard deviation using the set of trunk delay standard deviations; and

generating the confidence interval using the path delay standard deviation and the confidence level.

7.   (Original) A method for monitoring a network, comprising:

receiving a set of network delay samples;

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generating a path busy period for a path through the network using the set of network delay samples;

generating a path delay for the path using the path busy period and the set of network delay samples;

generating a path delay standard deviation using the path delay, path busy period, and the set of network delay samples;

generating a coefficient of variation for the path delay using the path delay and the path standard deviation; and

generating an alert by comparing the coefficient of variation to a threshold coefficient of variation value.

8.   (Original) The method of claim 7, further comprising applying a data sieve to the set of network delay samples.

9.   (Original) The method of claim 7, wherein generating a path busy period further includes:

receiving a time period;

generating a first path delay over the time period at a first time point using the set of network delay samples;

generating a second path delay over the time period at a second time point using the set of network delay samples; and

generating the path busy period by comparing the first path delay to the second path delay.

10.   (Original) The method of claim 9, wherein generating a path delay at a time point further includes:

determining a set of trunks included in the path;

for each trunk in the set of trunks, performing the following:

generating a trunk delay over the time period at the time point using the set of network delay samples; and

adding the trunk delay to the path delay.

11. (Original) The method of claim 7, wherein generating a path delay standard deviation further includes:

determining a set of trunks included in the path;

generating a set of trunk delay standard deviations from the set of trunks for the path busy period using the set of network delay samples; and

generating a path delay standard deviation using the set of trunk delay standard deviations.

12. (Original) A method for monitoring a network, comprising:

receiving a set of network delay samples;

generating a path busy period for a path through the network using the set of network delay samples;

generating a confidence interval for the path using the path busy period, the set of network delay samples, and a confidence level;

generating a busy period path delay for the path using the path busy period, the set of network delay samples, and the confidence interval; and

comparing the busy period path delay to a busy period path delay baseline including a plurality of previously generated busy period path delays.

13. (Original) The method of claim 12, further comprising applying a data sieve to the set of network delay samples.

14. (Original) The method of claim 12, wherein generating a path busy period further includes:

receiving a time period;

generating a first path delay over the time period at a first time point using the set of network delay samples;

generating a second path delay over the time period at a second time point using the set of network delay samples; and

generating the path busy period by comparing the first path delay to the second path delay.

15. (Original) The method of claim 14, wherein generating a path delay at a time point further includes:

determining a set of trunks included in the path;

for each trunk in the set of trunks, performing the following:

generating a trunk delay over the time period at the time point using the set of network delay samples; and

adding the trunk delay to the path delay.

16. (Original) The method of claim 12, wherein generating a confidence interval for the path further includes:

determining a set of trunks included in the path;

generating a set of trunk delay standard deviations from the set of trunks for the path busy period using the set of network delay samples;

generating a path delay standard deviation using the set of trunk delay standard deviations; and

generating the confidence interval using the path delay standard deviation and the confidence level.

17.   (Original) A method for monitoring a network, comprising:

receiving a set of network delay samples;

generating a trunk busy period for a trunk in the network using the set of network delay samples;

generating a trunk delay for the trunk using the trunk busy period and the set of network delay samples;

generating a trunk delay standard deviation using the trunk delay, trunk busy period, and the set of network delay samples;

generating a coefficient of variation for the trunk using the trunk delay and the trunk standard deviation; and

generating an alert by comparing the coefficient of variation to a threshold coefficient of variation value.

18.   (Original) The method of claim 17, further comprising applying a data sieve to the set of network delay samples.

19.   (Original) The method of claim 17, wherein generating a trunk busy period further includes:

receiving a time period;

generating a first trunk delay over the time period at a first time point using the set of network delay samples;

generating a second trunk delay over the time period at a second time point using the set of network delay samples; and

generating the trunk busy period by comparing the first trunk delay to the second trunk delay.

20. (Original) A method for monitoring a network, comprising:

receiving a set of network delay samples;

generating a trunk busy period for a trunk included in the network using the set of network delay samples;

generating a confidence interval for the trunk using the trunk busy period, the set of network delay samples, and a confidence level;.

generating a busy period trunk delay for the trunk using the trunk busy period, the set of network delay samples, and the confidence interval; and

comparing the busy period trunk delay to a busy period trunk delay baseline including a plurality of previously generated busy period trunk delays.

21. (Original) The method of claim 20, further comprising applying a data sieve to the set of network delay samples.

22. (Original) The method of claim 20, wherein generating a trunk busy period further includes:

receiving a time period;

generating a first trunk delay over the time period at a first time point using the set of network delay samples;

generating a second trunk delay over the time period at a second time point using the set of network delay samples; and

generating the trunk busy period by comparing the first trunk delay to the second trunk delay.

23. (Original) A method for generating a service level agreement delay value for a network, comprising:

receiving a set of network delay samples;

applying a data sieve to the set of network delay samples;

generating a path busy period for a path through the network by performing the following:

receiving a time period,

generating a first path delay over the time period at a first time point using the set of network delay samples,

generating a second path delay over the time period at a second time point using the set of network delay samples, and

generating the path busy period by comparing the first path delay to the second path delay;

generating a confidence interval for the path delay by performing the following:

determining a set of trunks included in the path;

generating a set of trunk delay standard deviations from the set of trunks for the path busy period using the set of network delay samples,

generating a path delay standard deviation using the set of trunk delay standard deviations, and

generating the confidence interval using the path delay standard deviation and the confidence level; and

generating the service level agreement delay value using the path delay and the confidence interval.

24.   (Original) The method of claim 23, wherein generating a path delay at a time point further includes:

  determining a set of trunks included in the path;

  for each trunk in the set of trunks, performing the following:

    generating a trunk delay for a trunk over the time period at the time point using the set of network delay samples; and

    adding the trunk delay to the path delay.

25.   (Original) A method for monitoring a network, comprising:

  receiving a set of network delay samples;

  applying a data sieve to the set of network delay samples;

  generating a path busy period for a path through the network by performing the following:

    receiving a time period,

    generating a first path delay over the time period at a first time point using the set of network delay samples,

    generating a second path delay over the time period at a second time point using the set of network delay samples, and

    generating the path busy period by comparing the first path delay to the second path delay;

  generating a confidence interval for the path delay by performing the following:

    determining a set of trunks included in the path;

    generating a set of trunk delay standard deviations from the set of trunks for path busy period

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using the set of network delay samples,

generating a path delay standard deviation using the set of trunk delay standard deviations, and

generating the confidence interval using the path delay standard deviation and the confidence level;

generating a coefficient of variation for the path delay using the path delay and the path standard deviation; and

generating an alert by comparing the coefficient of variation to a threshold coefficient of variation value.

26. (Original) The method of claim 25, wherein generating a path delay at a time point further includes:

determining a set of trunks included in the path;

for each trunk in the set of trunks, performing the following:

generating a trunk delay over the time period at the time point using the set of network delay samples; and

adding the trunk delay to the path delay.

27. (Original) A data processing apparatus adapted for generating a service level agreement delay value for a network, comprising:

a processor; and

a memory operably coupled to the processor and having program instructions stored therein, the processor being operable to execute the program instructions, the program instructions including:

receiving a set of network delay samples;

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generating a path delay for a path through the network over a specified time period using the set of network delay samples;

generating a confidence interval for the path delay using the path delay, the specified time period, the set of network delay samples, and a confidence level; and

generating the service level agreement delay value using the path delay and the confidence interval.

28. (Original) The data processing apparatus of claim 27, the program instructions further including applying a data sieve to the set of network delay samples.

29. (Original) The data processing apparatus of claim 27 wherein the specified time period is a path busy period for the path.

30. (Original) The data processing apparatus of claim 29, wherein the program instructions for determining a path busy period further include:

receiving a time period;

generating a first path delay over the time period at a first time point using the set of network delay samples;

generating a second path delay over the time period at a second time point using the set of network delay samples; and

generating the path busy period by comparing the first path delay to the second path delay.

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31. (Original) The data processing apparatus of claim 30, wherein the program instructions for generating a path delay at a time point further include:

    determining a set of trunks included in the path;

    for each trunk in the set of trunks, performing the following:

        generating a trunk delay for a trunk over the time period at the time point using the set of network delay samples; and

        adding the trunk delay to the path delay.

32. (Original) The data processing apparatus of claim 27, wherein generating a confidence interval for the path delay further includes:

    determining a set of trunks included in the path;

    generating a set of trunk delay standard deviations from the set of trunks for the specified time period using the set of network delay samples;

    generating a path delay standard deviation using the set of trunk delay standard deviations; and

    generating the confidence interval using the path delay standard deviation and the confidence level.

33. (Original) A data processing apparatus adapted for monitoring a network, comprising:

    a processor; and

    a memory operably coupled to the processor and having program instructions stored therein, the processor being operable to execute the program instructions, the program

instructions including:

receiving a set of network delay samples;

generating a path busy period for a path through the network using the set of network delay samples;

generating a path delay for the path using the path busy period and the set of network delay samples;

generating a path delay standard deviation using the path delay, path busy period, and the set of network delay samples;

generating a coefficient of variation for the path delay using the path delay and the path standard deviation; and

generating an alert by comparing the coefficient of variation to a threshold coefficient of variation value.

34. (Original) The data processing apparatus of claim 33, the program instructions further including applying a data sieve to the set of network delay samples.

35. (Original) The data processing apparatus of claim 33, wherein the program instructions for generating a path busy period further include:

receiving a time period;

generating a first path delay over the time period at a first time point using the set of network delay samples;

generating a second path delay over the time period at a second time point using the set of network delay samples; and

generating the path busy period by comparing the first path delay to the second path delay.

36. (Original) The data processing apparatus of claim 35, wherein the program instructions for generating a path delay at a time point further include:

determining a set of trunks included in the path;

for each trunk in the set of trunks, performing the following:

generating a trunk delay over the time period at the time point using the set of network delay samples; and

adding the trunk delay to the path delay.

37. (Original) The data processing apparatus of claim 36, wherein the program instructions for generating a path delay standard deviation further include:

determining a set of trunks included in the path;

generating a set of trunk delay standard deviations from the set of trunks for the path busy period using the set of network delay samples; and

generating a path delay standard deviation using the set of trunk delay standard deviations.

38. (Original) A data processing apparatus adapted for monitoring a network, comprising:

a processor; and

a memory operably coupled to the processor and having program instructions stored therein, the processor being operable to execute the program instructions, the program

instructions including:

receiving a set of network delay samples;

generating a path busy period for a path through the network using the set of network delay samples;

generating a confidence interval for the path using the path busy period, the set of network delay samples, and a confidence level;

generating a busy period path delay for the path using the path busy period, the set of network delay samples, and the confidence interval; and

comparing the busy period path delay to a busy period path delay baseline including a plurality of previously generated busy period path delays.

39. (Original) The data processing apparatus of claim 38, the program instructions further including applying a data sieve to the set of network delay samples.

40. (Original) The data processing apparatus of claim 38, wherein the program instructions for generating a path busy period further include:

receiving a time period;

generating a first path delay over the time period at a first time point using the set of network delay samples;

generating a second path delay over the time period at a second time point using the set of network delay samples; and

generating the path busy period by comparing the first path delay to the second path delay.

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41. (Original) The data processing apparatus of claim 40, wherein the program instructions for generating a path delay at a time point further include:

determining a set of trunks included in the path;

for each trunk in the set of trunks, performing the following:

generating a trunk delay over the time period at the time point using the set of network delay samples; and

adding the trunk delay to the path delay.

42. (Original) The data processing apparatus of claim 38, wherein the program instructions for generating a confidence interval for the path further include:

determining a set of trunks included in the path;

generating a set of trunk delay standard deviations from the set of trunks for the path busy period using the set of network delay samples;

generating a path delay standard deviation using the set of trunk delay standard deviations; and

generating the confidence interval using the path delay standard deviation and the confidence level.

43. (Original) A data processing apparatus adapted for monitoring a network, comprising:

a processor; and

a memory operably coupled to the processor and having program instructions stored therein, the processor being operable to execute the program instructions, the program instructions including:

receiving a set of network delay samples;

generating a trunk busy period for a trunk in the network using the set of network delay samples;

generating a trunk delay for the trunk using the trunk busy period and the set of network delay samples;

generating a trunk delay standard deviation using the trunk delay, trunk busy period, and the set of network delay samples;

generating a coefficient of variation for the trunk using the trunk delay and the trunk standard deviation; and

generating an alert by comparing the coefficient of variation to a threshold coefficient of variation value.

44. (Original) The data processing apparatus of claim 43, the program instructions further including applying a data sieve to the set of network delay samples.

45. (Original) The data processing apparatus of claim 43, wherein the program instructions for generating a trunk busy period further include:

receiving a time period;

generating a first trunk delay over the time period at a first time point using the set of network delay samples;

generating a second trunk delay over the time period at a second time point using the set of network delay samples; and

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generating the trunk busy period by comparing the first trunk delay to the second trunk delay.

46. (Original) A data processing apparatus adapted for monitoring a network, comprising:

a processor; and

a memory operably coupled to the processor and having program instructions stored therein, the processor being operable to execute the program instructions, the program instructions including:

receiving a set of network delay samples;

generating a trunk busy period for a trunk included in the network using the set of network delay samples;

generating a confidence interval for the trunk using the trunk busy period, the set of network delay samples, and a confidence level;

generating a busy period trunk delay for the trunk using the trunk busy period, the set of network delay samples, and the confidence interval; and

comparing the busy period trunk delay to a busy period trunk delay baseline including a plurality of previously generated busy period trunk delays.

47. (Original) The data processing apparatus of claim 45, wherein the program instructions for generating a trunk busy period further includes:

receiving a time period;

generating a first trunk delay over the time period at a first time point using the set of network delay samples;

generating a second trunk delay over the time period at a second time point using the set of network delay samples; and

generating the trunk busy period by comparing the first trunk delay to the second trunk delay.

48. (Original) A data processing apparatus adapted for generating a service level agreement delay value, comprising:

a processor; and

a memory operably coupled to the processor and having program instructions stored therein, the processor being operable to execute the program instructions, the program instructions including:

receiving a set of network delay samples;

applying a data sieve to the set of network delay samples;

generating a path busy period for a path through the network by performing the following:

receiving a time period,

generating a first path delay over the time period at a first time point using the set of network delay samples,

generating a second path delay over the time period at a second time point using the set of network delay samples, and

generating the path busy period by comparing the first path delay to the second path delay;

generating a confidence interval for the path delay by performing the following:

determining a set of trunks included in the path;

generating a set of trunk delay standard deviations from the set of trunks for the path busy period using the set of network delay samples,

generating a path delay standard deviation using the set of trunk delay standard deviations, and

generating the confidence interval using the path delay standard deviation and the confidence level; and

generating the service level agreement delay value using the path delay and the confidence interval.

49. (Original) The data processing apparatus of claim 48, wherein the program instructions for generating a path delay at a time point further include:

determining a set of trunks included in the path;

for each trunk in the set of trunks, performing the following:

generating a trunk delay for a trunk over the time period at the time point using the set of network delay samples; and

adding the trunk delay to the path delay.

50. (Original) A data processing apparatus adapted for monitoring a network, comprising:

a processor; and

a memory operably coupled to the processor and having program instructions stored therein, the processor being operable to execute the program instructions, the program instructions including:

receiving a set of network delay samples;

applying a data sieve to the set of network delay samples;

generating a path busy period for a path through the network by performing the following:

receiving a time period,

generating a first path delay over the time period at a first time point using the set of network delay samples,

generating a second path delay over the time period at a second time point using the set of network delay samples, and

generating the path busy period by comparing the first path delay to the second path delay;

generating a confidence interval for the path delay by performing the following:

determining a set of trunks included in the path,

generating a set of trunk delay standard deviations from the set of trunks for path busy period using the set of network delay samples,

generating a path delay standard deviation using the set of trunk delay standard deviations, and

generating the confidence interval using the path delay standard deviation and the confidence

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level;

generating a coefficient of variation for the path delay using the path delay and the path standard deviation; and

generating an alert by comparing the coefficient of variation to a threshold coefficient of variation value.

51. (Original) The data processing apparatus of claim 50, wherein the program instructions for generating a path delay at a time point further include:

determining a set of trunks included in the path;

for each trunk in the set of trunks, performing the following:

generating a trunk delay over the time period at the time point using the set of network delay samples; and

adding the trunk delay to the path delay.

52. (Original) A computer readable media embodying program instructions for execution by a data processing apparatus, the program instructions adapting a data processing apparatus for generating a service level agreement delay value, the program instructions comprising:

receiving a set of network delay samples;

applying a data sieve to the set of network delay samples;

generating a path busy period for a path through the network by performing the following:

receiving a time period,

generating a first path delay over the time period at a first time point using the set of network delay samples,

generating a second path delay over the time period at a second time point using the set of network delay samples, and

generating the path busy period by comparing the first path delay to the second path delay;

generating a confidence interval for the path delay by performing the following:

determining a set of trunks included in the path;

generating a set of trunk delay standard deviations from the set of trunks for the path busy period using the set of network delay samples,

generating a path delay standard deviation using the set of trunk delay standard deviations, and

generating the confidence interval using the path delay standard deviation and the confidence level; and

generating the service level agreement delay value using the path delay and the confidence interval.

53. (Original) The computer readable media of claim 52, wherein the program instructions for generating a path delay at a time point further include:

determining a set of trunks included in the path;

for each trunk in the set of trunks, performing the following:

generating a trunk delay for a trunk over the time period at the time point using the set of network delay samples; and

adding the trunk delay to the path delay.

54. (Original) A computer readable media embodying program instructions for execution by a data processing apparatus, the program instructions adapting a data processing apparatus for monitoring a network, the program instructions comprising:

receiving a set of network delay samples;

applying a data sieve to the set of network delay samples;

generating a path busy period for a path through the network by performing the following:

receiving a time period,

generating a first path delay over the time period at a first time point using the set of network delay samples,

generating a second path delay over the time period at a second time point using the set of network delay samples, and

generating the path busy period by comparing the first path delay to the second path delay;

generating a confidence interval for the path delay by performing the following:

determining a set of trunks included in the path,

generating a set of trunk delay standard deviations from the set of trunks for path busy period using the set of network delay samples,

generating a path delay standard deviation using the set of trunk delay standard deviations, and

generating the confidence interval using the path delay standard deviation and the confidence level;

generating a coefficient of variation for the path delay using the path delay and the path standard deviation; and

generating an alert by comparing the coefficient of variation to a threshold coefficient of variation value.

55. (Original) The computer readable media of claim 54, wherein the program instructions for generating a path delay at a time point further include:

determining a set of trunks included in the path;

for each trunk in the set of trunks, performing the following:

generating a trunk delay over the time period at the time point using the set of network delay samples; and

adding the trunk delay to the path delay.

56. (New) A method for estimating the quality of service of communication paths between two points of a network, each path consisting of a plurality of trunks, the method comprising:

storing samples of transmission delays of each trunk at multiple times during a given period of time;

determining a busy period of a particular path from the stored samples;

deriving a standard deviation for the particular path from the stored samples;

deriving a mean delay value for each trunk during the busy
period;

summing the mean delay values of the trunks to produce a
path delay; and

adding the path delay to a path standard error to produce a
total delay value.

57. (New) The method of claim 56, in which the busy period is
determined by averaging the path delay of the trunks for a first
fraction of the given period of time to derive a first mean path
delay; averaging the path delay of the trunks for a second
fraction of the given period of time to derive a second mean
path delay; comparing the first and second mean path delays;
adding to the larger of the first and second path delays the
average path delay of the trunks for a third fraction of the
given period of time to derive a third mean path delay; and
repeating the comparing and adding steps to derive the busy
period.

58. (New) The method of claim 57, in which the given period of
time is 24 hours and the fraction is 1 hour.

59. (New) The method of claim 58, in which the path delay for
each fraction of the given period of time is derived by
averaging the path delays of a sub-fraction of the given period
of time.

60. (New) The method of claim 59, in which the sub-fraction is
1 minute.

61. (New) The method of claim 56 or 60, in which the transmission delays are sampled at equally spaced times.

62. (New) The method of any one of claim 61, in which the standard deviation of the particular path is derived by taking the square root of the sum of squares of the standard deviations of the trunks in the particular path.

63. (New) The method of any one of claim 62, in which the fractions of the given periods of time partially overlap in a moving window equal to one sub-fraction.

64. (New) The method of any one of claim 63, in which the path standard error is the standard deviation for the particular path times a coefficient related to the sampling rate of the transmission delays and a confidence factor.

65. (New) The method of any one of claim 64, in which the samples are stored in a three dimensional matrix, where one axis is the time of the sample, a second axis is the trunk being sampled, and the third axis is the path between the two points.